

I Claim:

Sub. (1) → 1. In a batch liquid purifier combining an ozone generator producing ozone-containing gas, a reservoir for holding liquid during purification, and a pumping system operating during purification to pump the ozone-containing gas into contact with the liquid in the reservoir, an improvement comprising a vent pumping system arranged to exhaust air and ozone-containing gas from a vent space above the liquid in the reservoir.

10 2. The improvement of claim 1 wherein a pump for the vent pumping system is arranged downstream of the vent space and creates a subatmospheric pressure in the vent space.

3. The improvement of claim 1 wherein the vent pumping system flows air into the vent space.

15 3-4. The improvement of claim 1, wherein air flowing into the vent space enters the vent space through a porous element that is hydrophobic.

4-5. The improvement of claim 1, wherein gas flowing out from the vent space departs from the vent space through a porous element that is hydrophobic.

20 5-6. The improvement of claim 1 wherein the reservoir has an access opening large enough to permit cleaning the reservoir interior and including a closure lid arranged over the reservoir opening.

6-7. The improvement of claim 5 including a switch enabling operation of the purifier when the lid is closed.

25 7-8. The improvement of claim 5 including an indicator arranged for indicating completion of the purification process.

8-9. The improvement of claim 1 including a system for dispensing purified liquid from the reservoir.

⁹~~10~~. The improvement of claim ~~9~~⁸ including a filter for the liquid being dispensed and an indicator indicating a need for changing the filter.

¹⁰~~11~~. The improvement of claim ~~10~~⁹ wherein the indicator is
5 responsive to an extent of operation of the purifier.

¹¹~~12~~. The improvement of claim ~~9~~⁸ wherein the dispensing system includes a liquid pump controlled to reduce dry running time.

¹²~~13~~. The improvement of claim ~~9~~⁸ including a valve arranged in a dispensing outlet to close the outlet until the dispensing system is
10 activated.

¹³~~14~~. The improvement of claim ~~9~~⁸ wherein the dispensing system includes a movable spout that can be extended beyond a housing of the purifier for dispensing purified liquid.

¹⁴~~15~~. The improvement of claim ~~14~~¹³ including a switch
15 actuating the dispensing system upon extending the spout and deactivating the dispensing system upon retracting the spout.

¹⁵~~16~~. The improvement of claim ~~14~~¹³ including a switch blocking operation of the dispensing system unless the spout is extended.

¹⁶~~17~~. The improvement of claim 1 wherein the reservoir
20 includes a viewable light-transmitting portion accessible for cleaning and permitting viewing of bubbles rising in the reservoir.

¹⁷~~18~~. The improvement of claim 1 including a pressure responsive valve arranged upstream of a desiccant arranged in an air inlet to the ozone generator to keep air from entering the desiccant
25 except when the ozone generator is operating.

¹⁸~~19~~. The improvement of claim 1 ^{arranged so that} ~~wherein~~ the vent pumping system continues to pump for a period of time after pumping of the ozone-containing gas ceases.

¹⁹~~20~~. The improvement of claim 1 including a variable pressure
30 pumping means for the ozone-containing gas.

²¹²³ The improvement of claim 1 ¹¹ ~~wherein~~ ^{arranged so that} gas from the vent space is delivered by the vent pumping system to an ozone reducing element and then to atmosphere.

²²³⁴ The improvement of claim ¹ ~~wherein~~ ^{arranged so that} liquid is prevented from entering an air inlet and an air and ozone gas outlet from the vent space.

²³³⁵ The improvement of claim 1 wherein a lid closes the vent space over the reservoir during operation of the vent pumping system.

²⁴³⁵ The improvement of claim ²³ ~~including~~ ^{arranged so that} a lid lock device operable during a purification cycle.

²⁵³⁵ The improvement of claim ²³ ~~wherein~~ ^{arranged so that} opening the lid resets the purifier to assume liquid in the reservoir is impure.

²⁶³⁵ The improvement of claim ²³ ~~including~~ ^{arranged so that} an indicator activated after completion of a venting cycle for indicating that it is safe to open the lid.

²⁷⁸ The improvement of claim ⁹ ~~wherein~~ ^{arranged so that} liquid access to the dispensing system is blocked at the reservoir to prevent untreated liquid from entering the dispensing system.

²⁸³⁹ The improvement of claim ¹ ~~wherein~~ ^{arranged so that} the reservoir is illuminated to make rising bubbles visible.

²⁹ The improvement of claim 1 including a liquid circulating system communicating with the reservoir for circulating liquid during purification.

³⁰³¹ The improvement of claim ²⁹ ~~wherein~~ ^{arranged so that} the liquid circulating system flows the ozone-containing gas into the reservoir.

³¹³² The improvement of claim ²⁹ ~~wherein~~ ^{arranged so that} the liquid circulating system flows purified liquid from the reservoir to a dispensing outlet upon completion of a purification cycle.

³³32. The improvement of claim ³⁰29 wherein the liquid circulating system includes a filter.

¹⁷33. The improvement of claim ⁸32 wherein the dispensing system is arranged for circulating liquid to and from the reservoir during purification.

¹⁸34. The improvement of claim ¹⁷33 arranged so that wherein circulated liquid flows the ozone-containing gas into the reservoir.

Sub. A2
¹⁰35. A system of venting a batch liquid reservoir during purification of the liquid by an ozone-containing gas pumped from an ozone generator into the reservoir, the system including:
a vent pumping system arranged to draw gas from a vent space above the liquid in the reservoir to maintain the vent space at a pressure less than atmospheric.

³⁵36. The system of claim ³⁴35 including a light illuminating bubbles rising in the reservoir.

³⁶37. The system of claim ³⁴35 arranged so that wherein gas outflow from the vent pumping system is directed through an ozone-reducing element and then to atmosphere.

³⁷38. The system of claim ³⁴35 including an air inlet into the vent space.

⁴⁰39. The system of claim ³⁴35 arranged so that wherein the system includes dispensing purified liquid from the reservoir by moving a spout that can be extended beyond the housing of the purifier.

⁴¹40. The system of claim ⁴⁰39 including a switch blocking dispensing unless the spout is extended.

⁴²41. The system of claim ³⁴35 including an indicator responsive to a measure of purifier operation to indicate a need for changing a filter for the dispensed purified liquid.

⁴³42. The system of claim ³⁴35 arranged so that wherein inflow of air to a desiccant in an air inlet to the ozone generator is blocked except when liquid is being purified.

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43. ³⁸ The system of claim ~~38~~ ¹³³⁷ arranged so that wherein air flowing into the vent space cools a lamp illuminating bubbles rising in the reservoir.

44. The system of claim ~~35~~ ³⁴ including a barrier preventing liquid from leaving the vent space with out-flowing gas.

5 ³⁹ 45. The system of claim ~~38~~ ³⁷ including a barrier to prevent reservoir liquid from entering the air inlet.

⁴⁵ 46. The system of claim ~~35~~ ³⁴ including a reservoir lid closing the vent space over the liquid.

⁴⁶ 47. The system of claim ~~46~~ ⁴⁵ including a lid lock device
10 operable during a purification cycle.

⁴⁷ 48. The system of claim ~~46~~ ⁴⁵ arranged so that wherein opening the lid resets the purifier to assume liquid in the reservoir is impure.

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⁴⁸ 49. The system of claim ~~46~~ ⁴⁵ arranged so that wherein the vent pumping system operates after completion of pumping ozone gas into the reservoir.

15 ⁴⁹ 50. The system of claim ~~49~~ ⁴⁸ including an indicator indicating that it is safe to open the lid.

⁵⁰ 51. The system of claim ~~35~~ ³⁴ including an indicator indicating completion of the pumping of ozone-containing gas into the reservoir.

20 ⁵¹ 52. The system of claim ~~35~~ ³⁴ including a barrier arranged in a liquid outlet from the reservoir to prevent liquid from entering a dispensing system for purified liquid before the dispensing system is actuated.

⁵² 53. The system of claim ~~35~~ ³⁴ including liquid circulation from
25 and to the reservoir during purification.

⁵³ 54. The system of claim ~~53~~ ⁵² including a filter for liquid circulating from and to the reservoir.

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⁵⁴ 55. The system of claim ~~53~~ ⁵² arranged so that wherein circulating liquid flows ozone-containing gas into the reservoir.

14 ⁵² arranged so that
56. The system of claim ⁵³ wherein purified liquid is
dispensed via a path for liquid circulation.

Sub. 93
5 57. A method of purifying a batch of liquid in a reservoir by
means of an ozone-containing gas pumped from an ozone generator
into contact with the liquid in the reservoir, the method including:

- a. withdrawing ozone-containing gas from a vent space
above the liquid in the reservoir;
- b. closing the vent space with a reservoir lid that can be
opened to provide access to the reservoir; and
- 10 c. preventing liquid from entering a purified liquid
dispensing system until the purified liquid dispensing
system is operated.

58. The method of claim ⁵⁷ including illuminating bubbles
rising in the reservoir while the liquid is being purified.

15 59. The method of claim ⁵⁷ wherein the purified liquid
dispensing system includes a movable dispensing spout and a switch
blocking dispensing system operation unless the spout is moved to
extend from a housing of the purifier.

20 60. The method of claim ⁵⁷ including blocking any outflow of
liquid with the gas flowing out from the vent space.

61. The method of claim ⁵⁷ including dispensing purified
liquid from the reservoir by moving a spout to extend from a housing
of the purifier.

25 62. The method of claim ⁶¹ including closing the dispensing
outlet except when liquid is being dispensed.

63. The method of claim ⁵⁷ including using a measure of
purifier operation to indicate a need for changing a filter for the
dispensed liquid.

30 64. The method of claim 57 including admitting air to the
vent space.

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~~66.~~⁶⁶ The method of claim ~~57~~⁵⁷ including maintaining a subatmospheric pressure in the vent space while gas is being withdrawn from the vent space.

68. The method of claim 67 including indicating to an operator that it is safe to open the reservoir.

~~70.~~ The method of claim ~~57~~⁵⁸ including circulating liquid from and to the reservoir during purification.

~~72.~~⁷⁰ The method of claim ~~70~~⁶⁹ including using circulating liquid to flow the ozone-containing gas into the reservoir.

73. The method of claim ~~70~~⁶² including dispensing purified liquid via a path for the circulating liquid.